



# DETERMINANTS OF FOOD INSECURITY AMONG HOUSEHOLDS IN ADDIS ABABA CITY, ETHIOPIA

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## ABSTRACT

Even though there is long-held belief that urban populations are better off, or even favoured than rural populations, the recent food and financial crises have highlighted the problem of urban food insecurity in developing countries. Hence, the overall objective of this study was to examine the determinants of food insecurity among urban households in Addis Ababa city. To do so, both descriptive statistics and econometric analysis were employed. Descriptive statistics used Foster, Greer and Thorbeck distributional measure of food insecurity while econometric analysis used binary logistic regression model to analyze the data of a set of socio-economic variables as explanatory variables and food insecurity as independent variable.

The head count index shows that 58,16 % of the total households are below the food insecurity line. The food insecurity gap and severity were 20 % and 9,4 %, respectively. The result of the logistic regression model estimate indicates that out of the 10 factors included, 6 were found to have a significant influence on the probability of being food insecure at less than 10 % significance level. The variables considered were household size, age of household head, household head education, and access to credit, household asset possession, and access to employment.

Efforts should be made to improve income earning capacity of households, their education level with particular focus on vocational training, reduce household size with a view to reducing their dependency ratio and access of credit to the needy and trained people needs to be provided with proper targeting criterion.

## KEY WORDS

food, food insecurity, probability of being food insecure, severity, urban

## CLASSIFICATION

JEL: D12, I39, J62, O15, Q53

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## INTRODUCTION

Food is essential in human being's life. Enough food in terms of quantity and quality for all people is an important factor for a nation to continue its development. Lack of food in long terms will lead to hunger and starvation that can cause death. So that enough food is a necessity condition to be well nourished [1].

However, the world is home to over one billion under nourished people, over 98 % of whom lives in the developing world [2]. The population of the developing world is becoming more urban, with the urban population projected to double from 1,7 billion in 1995 to 3,4 billion in 2020 [3]. These countries are not capable enough to provide sufficient food for their expanding urban population. This leads to increased food insecurity and prevalence of poverty in the urban areas.

Urban populations in Africa are growing rapidly, and inequality is increasing. The major urban food problems of the 1970s and 1980s, food shortage and price shocks, have apparently been largely resolved at least in the short to medium term. Because of this, urban food security having long been defined as the issue of feeding the cities has dropped off the political agenda of urban planners and urban managers; indeed, specifically urban food security problems in Africa receive little attention from national food or nutrition policy planners [4].

As in many developing countries, food security assessments in Ethiopia have traditionally focused on rural areas, where the majority of the total population as well as the poorest and most food insecure segments of the population lives [5]. Nevertheless, the global increase of cereal and pulses price and the global financial crisis has put challenges on and increases food insecurity in urban areas of the country. This further driven by unemployment, underemployment, lack of sanitation, rising cost of living, reduced inter-dependency among urban households, household composition, low asset ownership, low level of education, high dependency on the informal sector, HIV/AIDS (estimated at 7,7 % prevalence in urban areas) and increased population pressure due to natural growth and rural-urban migration [6].

## REVIEW OF THE LITERATURE

Food security is defined in different ways by international organizations and researchers without much change in basic concept. According to FAO, food security is defined as ensuring that all people at all times have both physical and economic access to the food they need [7]. World Bank defined it as access by all people at all times to sufficient food for an active and healthy life [8]. Von Braun et al defined food security as access by all people at all times to the food required for a healthy life [9]. In 1996, the World Food Summit defines food security as 'Food security exists when all people at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life'.

Like as food security, food insecurity definition is forwarded by different researchers and international organizations. According to World Bank, food insecurity can be defined as 'the lack of capability to produce food and to provide access to all people at all times to enough food for an active and healthy life' [8]. Hamilton defined food insecurity as limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways [10]. In 1996, the World Food Summit explain that food insecurity exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life. This definition of food security is the most widely used definitions of food

security. This definition integrates stability, access to food, availability of nutritionally adequate food and the biological utilization of food. Therefore, for the purpose of this study, the definition put forward by World Food Summit (1996) was taken as a working definition of food security and the household level is considered as the key unit of food insecurity analysis.

According to World Food Programme the main determinants of food insecurity in urban context are: food availability, food supplies in to market, food access, purchasing power and access to market and food utilization, health and morbidity status [6]. Von Braun et al. denoted that food security is composed of availability of food, access to food, and risks related to either availability or access [9]. Variation in national, regional or local availability of food can contribute to food insecurity. Garrett and Ruel suggested that access that a household has to food depends on whether the household has enough income to purchase food at prevailing prices or has sufficient land and other resources to grow its own food [11]. The study conducted by Bonnard showed [12] that household ability to achieve food security in urban area is derived from the household's human, material, and institutional resource bases, which are often collectively referred in the literature as "food security factors." These factors include the educational and employment status, household demographics, urban agriculture, assets, saving, formal social assistance or direct transfer, informal social networks, access to clean water and sanitation and cost of living. The study of Urban Livelihoods and Food and Nutrition Security in Greater Accra, Ghana indicated that household food availability is a function of food prices, household demographics and household tastes and preferences [3]. M.S.Swaminathan Research Foundation and the World Food Programme in study of food insecurity Atlas of urban India [13], revealed that factors such as unemployment, illiteracy, infant mortality rate, lack of toilet facilities and safe drinking water, discrimination at social level and little political attention for urban areas determine food insecurity in urban India.

Mucavele suggested [14] that the main factors that affect food security in urban Maputo, Mozambique, are poverty, low family income, low availability of general alimentation at the family level, floods, family crisis, high unemployment levels and low levels of schooling and training and the absence of a social security system to alleviate the urban shocks. Von Braun et al. denoted that [15] employment and wages, along with prices and incomes, play the central role in determining the food security status of urban households.

The situation in Ethiopia is not much different from the conditions in other developing regions. For example, World Food Programme stated [6] that the common factors that cause household food-insecurity in urban areas of the country are: household size, age of household, sex of household head, marital status of household, education level of household, dependency ratio, access to credit, ownership of saving account, total income per adult equivalent, expenditure level (food and non-food), asset possession, access to social services, owner of home garden, access to subsidized food, sources of food, availability of food commodities, and supply of food commodities.

## **IMPORTANCE OF THE STUDY**

A study of determinants of urban household food insecurity is vital because it provides with information that will enable effective measures to be undertaken so as to improve food security status and bring the success of food security development programs. It will also enable development practitioners and policy makers to have better knowledge as to where and how to intervene in urban areas to bring food security or minimize the severity of food insecurity. Area specific identification of determinants of the food insecurity will ease the implementation of different development projects in the Addis Ababa city.

## STATEMENT OF THE PROBLEM

Though Ethiopia has abundant natural resources, most of its socioeconomic indicators are extremely low. In Ethiopia food shortage has aggravated the already poor economy of the country. Both chronic and transitory problems of food insecurity are widespread and severe in both rural and urban areas of the country [16]. However, a lot of studies conducted so far in the field give more emphasis to the rural area of the country [17-21]. But such partial assessments do not verify situations at grass root level and hide the true food insecurity problem of the country. Furthermore such studies do not look the underlying causes of food insecurity of household at the urban settings. The extent of food insecurity problem differs from place to place and in accordance to the social position and actual life conditions. So that research undertaking in area of food insecurity at the Addis Ababa city is essential since the results may give spot light to development planners in order to combat its problem at the urban level.

## OBJECTIVES OF THE STUDY

The overall objective of the study was to examine the socio economic determinants of food insecurity among urban households in Addis Ababa city. The specific objectives of the study were:

- to estimate the food insecurity gap and its severity among urban households, and
- to identify the determinants of food insecurity among urban households.

## HYPOTHESES

- Households with larger size are more prone to food insecurity.
- Households engaged in more income generating activities are more likely to experience food security.
- Households with access to credit service are less likely to face food insecurity compared to those with less access.

## RESEARCH METHODOLOGY

### DATA SOURCES AND SAMPLE SIZE

The study used the 2006/07 Young Lives household survey conducted by Young Lives of the Ethiopia. The survey gathered qualitative and quantitative data pertaining to social, demographic and economic aspects of households. The method of data collection used purposive and simple random sampling strategies. The selection of the sentinel sites followed a purposive sampling strategy, whereas the household selection within each sentinel site was done using simple random sampling. This is due to the research targeted the poor and food deficiency areas of the city. Accordingly, 423 households were covered in Young Lives household survey from Addis Ababa city. Therefore, the present analysis based on 423 sample households randomly selected from Young Lives site in the city.

### METHOD OF DATA ANALYSIS

The data collected were subjected to both descriptive statistics and econometrics analysis such as Foster, Greer and Thorbeck index of food insecurity and binary logit regression. A separate food insecurity line was developed for area. To achieve this, the cost of basic need method as proposed by Revalion and Bidani [22] was used. This is mostly done through identifying the food insecure 50 % of the sample population as a reference group with the assumption that in study area the food insecure part of society is above 50 %. The food

consumption behaviour of the reference group accesses to determine average quantities in per adult equivalent of basic food items that makeup the reference food basket. In this case, the basket makes up of the mean consumption levels (purchase, remittance and from aid) of basic food items. The calorie value of each food items constructs from World Health Organization of the food nutrition table. The total calorie obtained from consumption of this basket of average quantity per adult by an individual is:

$$\sum_i q_i K_i = T^* , \quad (1)$$

$T \approx T^*$ , but  $T \neq T^*$ . Here  $T^*$  is total calorie obtained by individual adult from consuming the average quantities,  $q_i$  is average quantity per adult of food item  $i$  consumed by individual,  $K_i$  the caloric value of the respective food item  $i$  consumed by individual adult and  $T$  is recommended consumed calorie per day per adult for Ethiopia, i.e. 9210 kJ = 2200 kcal.

The average quantity per adult of each food item scales up and down by a constant value  $T/T^*$  so as to provide total of 9210 kJ = 2200 kcal per adult per day before doing any activities. Then, multiply each food items after scaling up and down by the median price and sum up to get a food insecurity line.

A household was then considered food secure or insecure if the daily recommended calorie was equal or above and below the food insecurity line respectively. The degree of food insecurity was estimated using the Foster, Greer and Thorbeck (FGT) equation shown as:

$$P_\alpha = \frac{1}{N} \sum_{i=1}^q \left( \frac{z - y_i}{z} \right)^\alpha , \quad (2)$$

where  $\alpha$  is the egree of food insecurity with values of 0, 1 and 2 for headcount, short-fall and severity of food insecurity, respectively. Furthermore, in (2)  $N$  is total number of sample households,  $q$  the number of food insecure households,  $Z$  is the cutoff between food security and insecurity and  $y_i$  is the measure of per adult equivalent food calorie intake of the  $i^{\text{th}}$  household.

To examine the effect of demographic and socio economic characteristics on food insecurity and the probability of household being food insecure, data were collected on variables such as household size, household head age, sex, education, dependency ratio, access to various services, access to credit service, access to employment, asset possession and food aid. On the assumption that the probability of a household being food insecure is determined by underlying response variable that capture the true economic status of the household, the underlying response variable in the case of binary status was defined by binary logit regression relation. Following Gujarati [23] and Green [24], the functional form of logit model is specified as follows:

$$P(Y_i = 1) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_i)}} , \quad (3)$$

For simplicity, we write (3) as

$$P(Y_i = 1) = \frac{1}{1 + e^{-Z_i}} , \quad (4)$$

where:  $P(Y_i = 1)$  is the probability that a household being food insecure,  $Z_i$  is the function of a vector of  $n$  explanatory variables). Equation (4) is the cumulative distribution function. If  $P(Y_i = 1)$  is the probability of being food insecure, then  $1 - P(Y_i = 1)$  represents the probability of being food secured and is expressed as:

$$1 - P(Y_i = 1) = \frac{1}{1 + e^{Z_i}} , \quad (5)$$

thus we can write

$$\frac{P(Y_i = 1)}{1 - P(Y_i = 1)} = e^{Z_i}. \quad (6)$$

Equation (6) simply is the odds ratio, the ratio of the probability that a household will be food insecure to the probability that it will be food secured. Taking the natural log of equation (6), we obtain

$$L_i = \ln \frac{P(Y_i = 1)}{1 - P(Y_i = 1)} = Z_i, \quad (7)$$

where  $L_i$  is the natural logarithm of the odds ratio which is not only linear in the explanatory variables but in the parameters also.

Thus introducing the stochastic error term  $u_i$  the logit model can be written as

$$L_i = \ln \frac{P(Y_i = 1)}{1 - P(Y_i = 1)} = Z_i, \quad (8)$$

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + u_i, \quad (9)$$

where  $\beta_0$  is an intercept and  $\beta_1, \beta_2, \dots, \beta_n$  are slopes of the equation in the model, and  $X$  is vector of relevant household characteristics.

## RESULTS AND DISCUSSIONS

### DESCRIPTIVE RESULTS

This section reports the descriptive results of the study. Based on the food insecurity threshold point as a benchmark, 246 sample households (58,16 %) were found to be unable to meet their minimum subsistence requirement and 177 households (41,84 %) were found to meet their minimum subsistence require.

The FGT indices namely head count ratio, short-fall and severity of food insecurity are used to show how much the magnitude of food insecurity looks like in the study area.

**Table 1.** FGT result of total food insecurity situation in the study area.

Variable	Total Food Insecurity			
	Index	Standard error	Lower and upper bounds of 95 % confidence interval	
Head count ratio	0,58	0,024	0,532	0,628
Short-fall	0,20	0,012	0,176	0,224
Food insecurity severity	0,094	0,007	0,080	0,108

Table 1 shows that the headcount ratio, short-fall and severity of food insecurity were 58 %, 20 % and 9,4 %, respectively. This implies 58 % of the sampled households cannot meet the energy requirement recommended for subsistence. Each food insecure household needs 20 % of the daily caloric requirement to bring them up to the recommended daily caloric requirement level besides their per capita income and the relative deficiency among food insecure households is 9,4 %.

The estimated value of head count, food insecurity gap (short fall) and severity of food insecurity by socio-economic characteristics of household has been analyzed as follows: Table 2 shows that food insecurity was more severe in the large size household with food insecurity, headcount index, short-fall index and severity as 80,71 %, 32,6 % and 16,27 %, respectively. This fact indicates that food insecurity worsen as household size increased. This increase incidence of food insecurity with increase in family size confirms the prior hypothesis

**Table 2.** Estimated indices of food insecurity by socio economic characteristics of household. Data were computed from conducted survey's results.

Variable	Head count index	Short-fall index	Severity index
<b>Family size</b>			
Small (2-4)	0,3132	0,0708	0,0264
Medium (5-7)	0,5350	0,1701	0,0751
Large ( $\geq 8$ )	0,8071	0,3260	0,1627
<b>HH head age</b>			
$\leq 25$	0,5000	0,1551	0,0574
26-45	0,4955	0,1628	0,0759
$\geq 46$	0,6839	0,2496	0,1175
<b>HH head sex</b>			
Male	0,5645	0,2008	0,0937
Female	0,6176	0,2052	0,0964
<b>HH head Education</b>			
Literate	0,5662	0,1968	0,0918
Illiterate	0,7368	0,2572	0,1222
<b>Access to employment</b>			
Access to employment	0,5371	0,1868	0,0871
Without access to employment	0,6340	0,2205	0,1034
<b>Access to Credit</b>			
Credit access	0,5528	0,1998	0,0082
Without credit access	0,5933	0,2081	0,0924

of this study. Food insecurity was high for age group of older than 45 years with food insecurity headcount index, short-fall index and severity of 68,39 %, 24,96 % and 11,75 %, respectively. This implies that incidence of food insecurity increased with age of household head in the study area and/or the elder head households live great deprivation than younger head households. Food insecurity was worse in female headed household with food insecurity headcount index, short-fall index and severity of 61,76 %, 20,52 % and 9,64 %, respectively, than the male counterpart of 56,45 %, 20,8 % and 9,37 %. This implies that males are to some extent more engaged in income generating activities than females in the study area. The food insecurity was concentrated in the group with illiterate having an estimated headcount ratio, short-fall index and severity of 73,68 %, 25,72 % and 12,22 %, respectively. This analysis implies that illiterate households are more food insecure than literate ones since literate households are diversifying as well as increasing their means of income in order to drag out of food insecurity situation and lead quality life.

High indices of food insecurity were recorded for households with access to employment than no access to an employment. The estimated food insecurity headcount ratio, short-fall and severity for households without access to employment were 63,4 %, 22,0 % and 10,3 %, respectively. The food insecurity was more severe in the group with no access to credit service having an estimated headcount ratio, short-fall index and severity of 59,33 %, 20,8 % and 9,2 %, respectively. This indicates that households with access to credit are less food insecure than no access ones.

## ECONOMETRIC ANALYSIS

The result of the logistic regression model estimate revealed that out of the 10 factors, 6 variables were found to have a significant influence on the probability of being food insecure. These variables include household size, household head age, household head education, asset possession, access to credit service and access to employment. That means the coefficients of family size and asset possession were statistically significant at 1 percent probability level of significance where as age of household head, access to credit service and access to employment were statistically significant at 5 % probability level of significance. Furthermore, the coefficient of household head education was significant at 10 % probability level. The coefficients of 4 explanatory variables, namely sex of the household head, dependency ratio, food aid and access to various services, were not statistically different from zero at the conventional levels of significance. The code, type, variable description and result obtained from the binary logit model are presented in Tables 3 and 4, respectively.

**Table 3.** Description of variables included in the model estimation.

Code	Type	Description
Sizehh	Continuous	Household size in number
Headage	Continuous	Age of household in year
Headsex	Dummy	1 if household head is male, 0 otherwise
Dpratio	Continuous	Dependency ratio
Foodaid	Continuous	Food aid
HeadEduc	Dummy	1 if household head is literate, 0 otherwise
Credit	Dummy	1 if household got credit, 0 otherwise
Asset	Continuous	Asset possession
Acemply	Dummy	1 if household has access to employment, 0 otherwise
Accvar	Dummy	1 if household has access to various service, 0 otherwise

In light of the above summarized model results possible explanation for each significant independent variable are given consecutively as follows:

*Family size:* As pinpointed in various literatures, family size is identified as one of the important demographic factors that affect household food insecurity status. In light of this it was hypothesized that family size has positive relationship with food insecurity status of a household, in such a way that households with large family size have better chance of being food insecure than those with small numbers. In this study, the family size was found to be highly significant to determine household food insecurity. The coefficient for family size was found to be positively related with food insecurity and statistically significant at 1 percent probability level. This indicates that larger household size tends to be food insecure compared to smaller family size in the study area. This fully agrees with prior expectation. The marginal effect of family size revealed that the probability of being food insecure will increase by approximately 8,36 % with one additional family member in adult equivalent. This result is in conformity with the findings of Frehiwot [18] and Abebaw [19].

*Age of household head:* This variable affects food insecurity status positively and significantly at 5 % probability level in the study area. The positive relationship implies that older age household heads have better chance to be food insecure than younger ones. This is possible because older household heads are less productive and they lead their life by remittance and gifts. They could not participate in other income generating activities. On the other hand, older households have large number of families and their resources were distributed among their members. The marginal effect of age of household head indicates that the probability of being food insecure will increase by approximately 0,6 % when age of the household increases by one year. This result confirms with other findings [18, 25].



**Table 4.** Binary logit result for determinants of food insecurity. Data are output of the model. For these data, pseudo  $R^2 = 0,3606$  and count  $R^2 = 95,21$  what implies prediction success. Number of observations is 423, log pseudo likelihood  $-226,7324$ , Wald  $\chi^2(10) = 69,49$  and Prob  $> \chi^2 = 0,0000$ .

Variables	Coefficient	Stand. Error	p-value	Marginal effect (dy/dx)
Sizehh	0,450141	0,0533738	0,000***	0,0836052
Headage	0,0247641	0,0098253	0,012**	0,0060009
Headsex	0,0844804	0,2522869	0,738	0,0204138°
Depratio	0,211518	0,1457525	0,147	0,0512559
Foodiad	-0,0003625	0,000471	0,441	-0,0000879
HeadEduc	-0,6293699	0,3626464	0,083*	-0,1555647°
Credit	-1,062744	0,4641304	0,022**	-0,2251101°
Asset	-0,0004323	0,0000904	0,000***	-0,0001048
Acemply	-0,5441445	0,239012	0,023**	-0,1307246°
Accvarocons	-0,227023	0,2536139	0,371	-0,0553279°
	-1,046322	0,6996414	0,135	

°dy/dx is for discrete change of dummy variable.

\*Significant at 10 % level.

\*\*Significant at the 5 % level.

\*\*\*Significant at the 1 % level.

*Education level of household head:* This variable affects food insecurity situation negatively and significantly at 10 % probability level. The negative relationship indicates that literate households are less food insecure than illiterate households. The possible explanation is that household head education largely contributed on working efficiency, competency, diversify income, adopting technologies and becoming visionary in creating conducive environment to educate dependants with long term target to ensure better living condition than illiterate ones. This is due to educated household head plays a significant role in shaping household members. Thus, being literate reduces the chance of becoming food insecure in the sample households. The marginal effect of the variable reveals that for literate households the probability of being food insecure decreased by 15,55 %. The finding of this study was found consistent with what had been found by Ojogho [25] and Aschalew [26].

*Credit service:* The sign of the coefficient of this variable showed a negative relationship with food insecurity and is significant at 5 % probability level. The negative relationship implies that households with access to credit service have less chance to be food insecure than without access ones. This result is fully in conformity with the prior expectation. This is due to the fact that credit gives the household an opportunity to be involved in income generating activities so that derived revenue increases financial capacity and purchasing power of the household to escape from risk of food insecurity. Moreover, it helps to smooth consumption when household face with temporary food problem. The marginal effect of the variable shows that for households with access to credit the probability of food insecure decrease by 22,51 %. This result confirms with the findings of others [19, 20, 27].

*Asset possession:* Ownership of consumer durable and productive asset affects food insecurity status negatively and significantly at 1 % probability level in the study area. The negative relationship may indicate that in the study area, households who own productive assets like machinery, transportation and etc are less food insecure. This result fully agrees with prior expectation. The marginal effect of asset possession implies that the probability of being food insecure decrease by approximately 0,01 % as productive asset increase by one unit.

*Access to employment:* This variable is significant at 5 % probability level. It has a negative relationship with food insecurity in the study area. The negative relation indicates that households who have access to employment are less likely food insecure than no access one. Access to employment opportunities help to diversify and increase amount of income received by households. The fluctuation in access to employment determines food insecurity of urban households. Marginal effect shows that for households with access to employment the probability of being food insecurity decrease by 13 %. This result confirms the finding of Maxwell [28].

## CONCLUSIONS

The foregoing analysis attempted to analyze the determinants of urban household food insecurity in Addis Ababa city. First, an attempt has been made to describe the socio-economic characteristics of the food insecure and food secure sample household groups by using descriptive statistics. Second, an attempt has been made to identify factors that determine the urban household food insecurity using binary logit model of regression. Accordingly, in the study area the proportion of people who are unable to fulfill their food energy requirement in the year 2006/07 is 58 %. The percentage of food consumption needed to bring the entire food insecure population to the food poverty line is 20 percent with 95 % confidence interval of 17,65 % to 22 %. While the percentage of relative deficiency among food insecure population is 9,4 % with “95 confidence interval” of 8 % to 10 %. The result of the logistic regression model indicated that six out of ten variables namely household size, age of household head, household head education, asset possession, access to credit service, and access to employment were found to be statistically significant as determinants of household food insecurity in the study area. Household size and asset possession were significant at less than one percent probability level while access to credit service, age of household head and access to employment were significant at less than 5 % probability level. In addition, the household head education was significant at 10 % probability level. Household size and age of household head were found to be positively related with probability of being food insecure where as access to credit service, asset possession, household head education and access to employment were negatively related with probability of being food insecure.

## RECOMMENDATIONS

The possible areas of intervention that emanate from the results of the research study are presented as follows: As household size and food insecurity are positively related serious attention has to be given to limit the increasing population in the study area. This can be achieved by creating sufficient awareness to effective family planning in the urban households. Further, household heads are advised to reduce the size of their household and their dependency ratio. Age has positive impact on food insecurity. This means older households are more likely to be food insecure. Therefore, capacity building for old household heads should be given. The effect of education on household food insecurity confirms the significant role of the variable in consideration for betterment of living condition. The more household head educated, the higher will be the probability of educating family member and familiar with modern technology, which the twenty first century so badly demands. So, strengthening both formal and informal education and vocational or skill training should be promoted to reduce food insecurity in the study area. Productive assets are highly binding resource in the study area and negatively related with food insecurity. Therefore; development partner support ought to scale up on existing urban cash-based social protection programs to ensure building up of assets for the asset poor households. Access to credit can create an opportunity to be involved in economic activity that generates revenue to households. Development partners operating in the study area should implement provision of

credit to eligible households using targeting criterion that reflects actual characteristics of food insecure households. The other pressing issue related to provision of credit is the requirement of collateral and group lending procedure, which discourages so many households. People are afraid of holding accountability for others so individual lending should be considered as another option and collateral requirement should be avoided if there is a need to lift food insecure households from their current situation. Borrowers should be encouraged to save or contribute as matching fund to reach the limited resources over large number of needy people. The access to employment opportunity negatively related with food insecurity in the study area. Access to job helps urban households to diversify their income which in turn alleviates the food deficiency among poor households. Therefore; both government and civil society organizations have roles to play in addressing these issues. The policy initiatives that will do most to enhance the potential for self-employment are basic condition in reducing food insecurity in the city. Here again, certain preconditions apply.

This study has attempted to come up with the result of the analysis with defined scope however a lot remained to be unanswered. To provide basic information on the determinants of urban food insecurity, the social, political, natural and environmental dimensions, role of urban agriculture in urban food insecurity, descriptive data on purchasing patterns of food insecure, specific characteristics that make urban poor more vulnerable to food insecurity demands future researchers' attention.

## **APPENDIX**

**Table A1.** Nutritional Based Equivalence Scales. Calculated from data of the World Health Organization (1985) by Stefen Dercon, cited in [29]. Data in cells are in kilocalories, with 1 kilocalorie  $\approx$  4,2 kJ.

<b>Age</b>	<b>Men</b>	<b>Women</b>
0-1	0,33	0,33
1-2	0,46	0,46
2-3	0,54	0,54
3-5	0,62	0,62
5-7	0,74	0,70
7-10	0,84	0,72
10-12	0,88	0,78
12-14	0,96	0,84
14-16	1,06	0,86
16-18	1,14	0,86
18-30	1,04	0,80
30-60	1,00	0,82
60-	0,84	0,74

**Table A2.** Kilocalorie conversion for calculating food insecurity line.

No.	Food item	Energetic value, kcal	Median price of food items	Monthly energetic value per adult equivalent per kg, kcal
1	Cereals	341	4,5	8,545871
2	Pulse	320	7	0,498932
3	Pasta/bread	351	3,5	7,343987
4	Tuber	151	1	1,859594
5	Oil	884	15	0,647204
6	Vegetables	38	1	0,891623
7	Salt	70	1,3	1,211637
8	Sugar	400	7	0,560642
9	Coffee	10	20	0,498932

**Table A3.** Binary logit out put logistic regression.

Number of obs = 423

Log pseudolikelihood = -226,324

Wald chi2(11) = 69,49

Pseudo R2 = 0,3606

Prob &gt; chi2 = 0.0000

foodline	Robust Coef.	Std. Err.	Z	P >  z	[95 % Conf. Interval]
sizehh	.3450141	.0533738	6.46	0.000	.2404035 .4496248
headage	.0247641	.0098253	2.52	0.012	.0055069 .0440213
headsex	.0844804	.2522869	0.33	0.738	-.4099929 .5789538
depratio	.211518	.1457525	1.45	0.147	-.0741517 .4971876
foodiad	-.0003625	.000471	-0.77	0.441	-.0012856 .0005605
headeduc	-.6293699	.3626464	-1.74	0.083	-1.340144 .0814039
credit	-1.062744	.4641304	-2.29	0.022	-1.972423 -.1530651
Asset	-.0004323	.0000904	-4.78	0.000	-.0006094 -.0002552
accemply	-.5441445	.239012	-2.28	0.023	-1.012599 -.0756897
accvaro	-.227023	.2536139	-0.90	0.371	-.7240971 .270051
_cons	-1.046322	.6996414	-1.50	0.135	-2.417594 .3249497

**Table 4.** Marginal effects after logit. $y = \text{Pr}(\text{foodline}) (\text{predict}) = .60636364$ 

variable	dy/dx	Std. Err.	z	P >  z	[ 95% C.I. ]	X
Sizehh	.0836052	.01271	6.58	0.000	.058696 .108514	6.70922
headage	.0060009	.00238	2.52	0.012	.00134 .010662	45.6123
headsex*	.0204138	.06076	0.34	0.737	-.098679 .139506	.321513
depratio	.0512559	.03531	1.45	0.147	-.017947 .120458	.982215
foodiad	-.0000879	.00011	-0.77	0.442	-.000312 .000136	93.1775
headeduc	-.1555647	.0894	-1.74	0.082	-.330788 .019658	.118203
credit*	-.2251101	.08007	-2.81	0.005	-.382053 -.068167	.910165
Asset	-.0001048	.00002	-4.65	0.000	-.000149 -.000061	1945.3
accemply*	-.1307246	.05645	-2.32	0.021	-.241371 -.020078	.531915
accvaro*	-.0553279	.0621	-0.89	0.373	-.177041 .066385	.321513

\* dy/dx is for discrete change of dummy variable from 0 to 1

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## **ODREDNICE NESIGURNOSTI U OPSRKBI HRANOM KUĆANSTAVA ADIS ABEBE**

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### **SAŽETAK**

Unatoč dugogodišnjem vjerovanju kako urbana populacija živi bolje i favoriziranije od ruralne populacije, nedavna kriza hrane i financijska kriza istaknule su problem nesigurnosti opskrbe hranom urbane populacije zemelja u razvoju. Zbog toga je opći cilj ovog rada ispitivanje odrednica nesigurnosti opskrbe hranom urbanih kućanstava u Adis Abebi. Pritom su primijenjene deskriptivna i ekonometrijska analiza. Deskriptivna statistika koristi distributivnu mjeru nesigurnosti u opskrbi hranom kako su je uveli Foster, Greer i Thorbeck. Ekonometrijska analiza koristi binarni model logističke regresije za analizu podataka skupa socio-ekonomskih varijabli kao eksplanatornih varijabli, a nesigurnost u opskrbi hranom kao neovisnu varijablu.

Indeks broja glava pokazuje kako je 58,16 % svih kućanstava ispod linije nesigurnosti opskrbe hranom. Procijep nesigurnosti opskrbe hranom i ozbiljnost iznose 20 %, odnosno 9,4 %. Rezultati procjene pomoću modela logističke regresije pokazuju kako od 10 uključenih varijabli njih 6 značajno utječe na nesigurnost u opskrbi hranom na razini značajnosti od 10 %. Razmatrane varijable su veličina kućanstva, dob glave obitelji, obrazovanje glave obitelji, dostupnost kredita, vlasništvo i dostupnost obrazovanju.

Potrebno je unaprijediti mogućnost prihodovanja kućanstava, obrazovnu strukturu s naglaskom na strukovnom obrazovanju, smanjiti veličinu kućanstava radi smanjivanja njihove ovisnosti. Nadalje, potrebno je unaprijediti dostupnost kredita, a osposobljenim ljudima omogućiti primjerene ciljeve.

### **KLJUČNE RIJEČI**

hrana, nesigurnost opskrbe hranom, vjerojatnost nesigurnosti opskrbe hranom, ozbiljnost, urbano